Light and Lighting

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Wanted—A Lighting Cost Factor

A PERTINENT suggestion was thrown out by Mr. Percy Good at the last I.E.S. Sessional Meeting—that people should be led to think of the cost of lighting not as an absolute item but as a fraction (usually a very small fraction) of total expenditure on installation, equipment and maintenance.

What we need is a recognised "**Lighting Cost Factor.**"

The factor would naturally vary with the situation. In normal times large stores and places of entertainment care little about the cost of lighting provided *the effect* is obtained. Their factor would be high.

At the other end of the scale we have small communities, unable to finance the cost of public lighting and requiring for this purpose State assistance.

But whatever the circumstances the factor would be determined by scientific consideration of ways and means and benefits to be derived, not merely by tradition or caprice.

Black-Out in Australia

Two months ago we were commenting on the black-out problems confronting the United States. Receipt of the December issue of the "I.E.S. Lighting Review" (Melbourne) reminds us that Australia, too, is now menaced—a contingency which few of us would have anticipated in the early days of the war, and which we now survey with deep concern, recalling the many sympathetic messages which we ourselves received from friends across the water during the period of intense air raids over this country. The sudden extension of the war to the Pacific led to the instant inclusion in the "I.E.S. Lighting Review" of articles containing advice on the black-out and air-raid precautions in industry, in which the familiar, melancholy, but necessary, procedure in regard to obscuring curtains and protective devices is briefly stated and illustrated. The services of the Illuminating Engineering Societies will doubtless be utilised to the full by the Australian Government, whose problems, like those in the United States, may well present differences from those encountered in Great Britain.

Vision at Low Intensities

We learned with great interest that the series of lectures by Dr. W. D. Wright on the above subject, recently announced to take place at the Imperial College of Science and Technology in the first week in February, was in such demand that an "overflow" repetition of the course later in the month became necessary. This is surely a welcome and remarkable illustration of interest in this somewhat abstruse subject—inevitably stimulated by the privations of war.

American I.E.S.

Progress to Date

Of equal interest to the technical papers presented at annual conventions of the American I.E.S. is the report of the general secretary on the progress of the society, always very full and complete. Recent years have been bumper ones in regard to membership. Following the financial crisis of 1931-33, when the membership fell from over 2,000 to 1,300, it has risen rapidly to over 3,200. The net increase for the past year (353) was a record. New York, Ohio, and Illinois, all over the 300 mark, are the States with greatest local membership. The membership as a whole is, however, very widely distributed, and the wisdom of promoting sectional activity, so that all members have ready access to local meetings, as well as the opportunity of joining in one annual convention, is evident in such a vast area as the United States. Even in our little island, experience seems to show that similar methods are advantageous. The procedure of forming centres and groups has been a definite success, even in war-time, and under happier conditions something resembling an annual convention would doubtless prove a success, and was, indeed, in contemplation before the outbreak of war.

Fluorescent Lamps and their Applications

During next month I.E.S. members will have the opportunity of attending two meetings dealing with Fluorescent Lamps. On April 14 Mr. Aldington will repeat in London the paper on this subject previously given before the North Western Centre, but will include some additional matter dealing with applications of these lamps. The meeting will be held at 5 p.m. at the E.L.M.A. Lighting Service Bureau (2, Savoy-hill, W.C.2). No doubt the adoption of a later hour (5 instead of 2.30 p.m.) in view of the longer period of daylight, will be an advantage to many members

The Institution of Electrical Engineers has kindly invited I.E.S. members to attend the meeting of their Installation Section which is to be held at Savoy-place on April 16 at 6 p.m., when a paper on a similar subject by Mr. L. J. Davies and Mr. W. J. Ruff is to be read. We strongly advise all members who can do so to attend both gatherings.

More Problems

We recently commented upon the success of "Problems" meetings and similar gatherings where short papers on widely different topics are presented. The I.E.S. Scottish Centre adopted this plan on February 18, when Mr. F. M. Hale ("Do Our Eyes Deceive Us?"), Mr. T. Nisbet ("Absorption of Smoky Atmospheres") and Mr. M. W. Hime ("Maintenance in Industrial Lighting") all dealt with interesting topics. Mr. Hales' comments on differences in intensity, colour and diffusion of natural and artificial light led to discussion on the quality of tungsten, mercury and sodium light and the merits of yellow fog discs. Mr. Nisbet pointed out the prevalence of high buildings with smoky atmospheres in the West of Scotland and mentioned records in steel works showing atmospheric absorbtions of 13, 22 and 43 per cent. Mr. Hime discussed cases in which allowances for depreciation went far beyond the normal. He emphasised the vital importance of maintenance and advocated the wider use of dust-proof fittings.

Colour Research at The Imperial College of Science

The meeting of the Colour Group on Wednesday, February 11, was in two parts. At 2.30 p.m. the second annual general meeting was held for the election of officers and committee. Dr. W. D. Wright and Mr. H. D. Murray were re-elected chairman and hon. secretary respectively, with the committee constituted as follows:—J. Guild (N.P.L.), J. G. Holmes (Chance Bros.), Dr. V. G. W. Harrison (Printing and Allied Trades Res. Assn.), R. G. Horner (Ilford, Ltd.), Dr. R. K. Schofield (Rothamsted Exptl. Station), and G. S. J. White (I.C.I.). The Hon. Secretary presented his report which mentioned *inter alia*, the setting up of sub-committees on colour terminology and on colour-blindness and the active co-operation between the Group and the Inter-Society Colour Council of the U.S.A.

At 3 p.m. the chair was taken by Dr. Schofield for the Sixth Science meeting of the Group, and Dr. Wright delivered the Chairman's Address, taking as his subject "Research on Colour Physics at South Kensington, 1877-1942." He began with a description of the work carried out by Sir Wm. Abney between 1877 and 1907, at first in the "Science and Art Department of the Board of Education," as it was then termed, and later in the newly erected buildings of the Royal College of Science. He said that Abney's interest in the subject was aroused by his work on colour photography. In the latter part of the period mentioned, Abney worked with Prof. W. Watson. In 1927 the subject was taken up again by Prof. L. C. Martin and later by the lecturer, with the financial assistance of the Medical Research Council.

Dr. Wright showed on the screen a diagram of Abney's colour-patch apparatus, and compared this with his own apparatus designed for the study of the phenomena of colour-mixture. He gave a condensed account of the work involved in the determination of the spectral mixture curves and in this connection he discussed the variations in colour matching met with among different observers and the possibility of correcting those variations. He then went on to review the work on hue discrimination, with particular reference to point sources of light and the specification of colour tolerances for light signals. The final part of the lecture was devoted to suggestions for future research, especially the development of photoelectric spectrophotometry, and the desirability of having in this country a recording spectrophotometer.

In the discussion which followed the address, several members referred to details of instrument design which Dr. Wright had mentioned. The next meeting of the Group is to be held in Manchester.

REVIEWS OF BOOKS AND PUBLICATIONS RECEIVED

The Practical Electrician's Pocket Book. (*Odhams Press, Ltd. London, 1942; pp. 462 + xlvi. Price 3s. post free.*)

Once more this handy little pocket book is before us. It remains, after forty-four years of existence, a remarkable instance of condensed information at a very reasonable price. We note there are some modifications in the familiar contents, such as the inclusion of a new chapter on electrical devices for incendiary bomb detection, and that the chapter on kinema equipment has been rewritten. In the section on lighting there is apparently no mention of the Factories (Standards of Lighting) Regulations, the Fifth Report, or the I.E.S. Code!

The "Gas Journal" Calendar and Directory. (*Walter King, Ltd. London, 1942; pp. 244 + xxxii.*)

This directory makes another welcome appearance. In addition to its complete record of gas undertakings, it includes one specially useful feature, a list of public lighting engineers for Gt. Britain and other useful data, apart from the handbook, compiled by Col. W. M. Carr, which contains much technical information of indubitable value to gas engineers. We have only one criticism of this production, the omission of any reference to illumination, photometry, and lighting generally. Whilst we appreciate that this is a somewhat specialised production, we should like to see some reference to such matters in a future edition.

Advance Planning in Lighting Reconstruction

Proceedings at the I.E.S. Sessional Meeting held in London on March 10, 1942

For their Sessional Meeting in London, on March 10, the Illuminating Engineering Society reverted to the House of the Royal Society of Arts.

The I.E.S. meeting was preceded by the Annual Meeting of the National Illumination Committee, over which Col. Kenelm Edgcumbe presided. The proceedings, however, were mainly formal, and necessarily brief, as there is unfortunately little opening for international action at the present time, and were confined mainly to the presentation of the Chairman's report and the accounts for the past year.

At the I.E.S. meeting, over which Mr. W. J. Jones presided, an address on "Advance Planning in Lighting Reconstruction" was delivered by Mr. Howard Robertson, F.R.I.B.A., who raised a number of interesting points. After the war, he suggested, Great Britain might not rank as a great mass-production nation. Its chief asset might be the traditional excellence of quality, rather than quantity. This should influence procedure in post-war planning.

There might, however, be a demand for rebuilding and lighting to be done very rapidly, on simple clear-cut lines, the minimum necessary being provided. But if that were the national policy we could say good-bye to the finer conception of planning and building which regards all technical and scientific progress as profoundly influencing design.

Illumination, Mr. Robertson remarked, provided a capital instance of the difference between building and architecture. You may have buildings erected in the quickest and cheapest way, the illuminating engineer being then asked to string his lights wherever there is room for them; or such buildings as those being erected in America, where the lighting is admirably built into the structure, not interfering with daylight or other requirements. Illumination should enter into all reconstruction conceptions. Standards should be insisted upon. There should be legislation to ensure the control of signs, standard illuminated street numbers, and the lighting of public streets and open spaces. The whole field had been admirably covered in Mr. Ackerley's recent address. It is now necessary to implement the collaboration between the architect and the illuminating engineer. Parsimony and lack of imagination go hand in hand in too much of our national business. Illuminating engineering and architecture would both suffer greatly from such policies.

In conclusion, the author suggested that the Ministry of Works and Planning ought to appoint a Director of Illumination, in the same way as it had directors of bricks, of standardisation, etc. It should also appoint a small paid panel of qualified men from the illuminating and architectural professions to make a proper study and report.

In the ensuing discussion sympathetic interest in the problem was expressed and numerous ideas for post-war development were suggested. It was evident, however, as Mr. Howard Robertson later pointed out, that there was no general understanding as to how these ideas were to be realised—in short, as yet no very coherent *plan*. This, however, is perhaps too much to expect at the present moment, and it should be the task of committees to hammer these ideas into a definite concrete scheme.

Fluorescent Lighting in an Underground Factory

Readers will have noticed with interest the references in the daily Press to a vast underground factory "somewhere in Britain," which has been evolved from a disused quarry and occupies an area of several square miles. The factory will be commencing the production of aircraft almost immediately. There will be little to be seen on the surface, and the site should be extremely difficult to locate from the air, besides being practically immune to attack from overhead. Yet, when the works are completed, the thousands of workers will have the benefit of lodgings, hostels, canteens, shops, dance halls, cinemas, etc., and will thus become a self-contained underground community. The factory has also its own artesian well and reservoir.

Entry to the galleries and roads, 90 ft. below the surface, is effected by eight lifts, each accommodating fifty persons. The floors are concreted, but the walls are of the natural stone, strengthened where necessary. Ventilation shafts keep the air fresh. The main lighting is by fluorescent lamps, though alternative methods are available.

Two views are presented showing a part of this vast underground aircraft factory, where thousands of Mazda 80-watt, 60 in. fluorescent lamps are being used to provide daylight lighting of high intensity over the essential working areas.

The installation is being planned on localised general lighting principles. The erection of the lighting fittings has had to be completed prior to the installation of the production plant.

Owing to the peculiar nature of the surroundings, control units and condensers are accommodated on special straps in the suspension chains, and the reflectors themselves are of the open top variety, resulting in reasonable brightness of walls and ceilings.

We are indebted to the British Thomson-Houston Co., Ltd., for the above illustrations showing the fluorescent tubes being fixed in position.

Literature on Lighting

(Abstracts of Recent Articles on Illumination and Photometry in the Technical Press)

(Continued from p.26, February, 1942)

In this issue "Literature on Lighting" is devoted exclusively to the series of papers read at the last Annual Convention of the American I.E.S. and presented in "Illuminating Engineering" (Dec. 1941). We hope shortly to give fuller particulars of some of these contributions.

PHOTOMETRY

19. Practical Photometry of Fluorescent Lamps and Reflectors.

G. R. Baumgartner. Am. Illum. Eng. Soc. Trans., pp. 1341-1353, 10, Dec., 1941.

Measurement of lamp light output by sphere photometers and candle-power measurements are compared. The effect of temperature on light output are discussed. Methods of photometry of fittings with fluorescent lamps are suggested. J. S. S.

SOURCES OF LIGHT

20. High and Low Voltage Fluorescent Lamps.

J. W. Marden and G. Meister. Am. Illum. Eng. Soc. Trans., pp. 1286-1297, 10, Dec., 1941.

The effect of ambient temperature, gas pressure, electrode construction and powder coating on the light output and efficiency of high and low voltage fluorescent lamps is discussed. J. S. S.

LIGHTING EQUIPMENT

21. Design of Reflectors for Fluorescent Lamps.

D. P. Severance. Am. Illum. Eng. Soc. Trans., pp. 1314-1329, 10, Dec., 1941.

The reflector sections particularly suitable for use with tubular fluorescent lamps are discussed, the involute of a circle, the section of a circle and the logarithmic spiral. An analytical method of calculating illumination is given. J. S. S.

22. The Application of High Voltage Fluorescent Tubing to Lighting Problems.

D. P. Caverly. Am. Illum. Eng. Soc. Trans., pp. 1298-1313, 10, Dec., 1941.

The author suggests that the use of high voltage fluorescent tubing for advertising and decorative effects has led users to ignore fundamentals of design. Properly used, such tubing should be a valuable light source for many applications. J. S. S.

23. Seeing with Polarised Headlamps.

V. Roper and K. D. Scott. Am. Illum. Eng. Soc. Trans., pp. 1205-1218, 10, Dec., 1941.

The performance of head-lamps emitting polarised light, in combination with a suitable analyser is discussed. Technical and practical difficulties are described. J. S. S.

APPLICATIONS OF LIGHT

24. Steps of Progress.

I. E. S. Committee on Progress. Am. Illum. Eng. Soc. Trans., pp. 990-1029, 10, Dec., 1941.

A summary is given of advances in all branches of illuminating engineering made in America during the year 1941. J. S. S.

25. The Anatomy of Visual Efficiency.

H. L. Logan. Am. Illum. Eng. Soc. Trans., pp. 1057-1108, 10, Dec., 1941.

The author suggests that much of the sensation of glare usually considered to be due to a lighting installation is caused by functional disorders in the body, which render the subject hypersensitive; and that in an effort to avoid direct glare, lighting engineers tend to use indirect lighting which makes walls and ceiling brighter than the objects to be viewed or examined. It is further suggested that in the long run greater eyestrain and discomfort is caused by such conditions than by a small amount of "discomfort" glare.

A method of design is presented, based upon the flux distribution occurring in naturally lighted fields of view. It is claimed that this technique satisfies

both visibility and comfort requirements.

In the discussion many authorities disagree with the author's statements.

J. S. S.

26. Comfortable Lighting.

W. Harrison and M. Luckeish. Am. Illum. Eng. Soc. Trans, pp. 1109-1128, 10, Dec., 1941.

It is deduced that comfortable seeing depends on four main factors: (1) Illumination on the work. (2) Illumination at the eyes of the worker. (3) Brightness and brightness contrast in the visual field. (4) Brightness and brightness contrast as viewed from the work. Limiting values for these criteria are suggested. J. S. S.

27. Interpretation of Spectral Distribution Data in Practical Colour Applications.

R. L. Oetting and C. L. Amick. Am. Illum. Eng. Soc. Trans., pp. 1369-1396, 10, Dec., 1941.

Data on spectral distribution of various light sources and on spectral reflectivity of a large number of coloured samples are presented. It is urged that more widespread knowledge of such characteristics would enable engineers to utilise new light sources to greater advantage. J. S. S.

28. Daylight Illumination on Interiors Fenestrated with Glass Blocks.

G. M. Rapp and A. H. Baker. Am. Illum. Eng. Soc. Trans., pp. 1129-1156, 10, Dec., 1941.

The paper describes measurements of daylight illumination made in an interior typical of large classrooms, fenestrated with glass wall blocks. Data are given for the prediction of minimum illumination for any outdoor conditions, at any season or latitude in the United States. J. S. S.

29. Lighting and Seeing in the Drafting-room.

W. G. Darley and L. S. Ickis. Am. Illum. Eng. Soc. Trans., pp. 1462-1489, 10, Dec., 1941.

The merits of a variety of lighting systems applied to a number of drawing papers with both ink and pencil lines are compared. In general it is suggested that directional lighting fittings of large area give the best results.

J. S. S.

30. Lighting of Large Factory Areas with Fluorescent Lamps.

G. J. Taylor. Am. Illum. Eng. Soc. Trans., pp. 1414-1451, 10, Dec., 1941.

Methods are suggested for lighting large areas with fluorescent lamps at high and low mountings. Maintenance is discussed, and methods of measuring illumination are suggested. J. S. S.

31. Improved Vision in Machine Tool Operations by Colour Contrast.

A. A. Brainerd and M. Denning. Am. Illum. Eng. Soc., Trans., pp. 1397-1413, 10, Dec., 1941

It is claimed that in addition to increase of ease of seeing by the use of brightness contrast the choice of suitable light colours gives a stereoscopic effect leading to greater safety and visibility. Data on the performance of operators on various machine tools are given.

J. S. S.

32. Planning for Maintenance.

E. W. Beggs. Am. Illum. Eng. Soc. Trans., 10, pp. 1355-1368, Dec., 1941.

The maintenance of fluorescent lamp installations is discussed, with particular reference to ease of access, fitting design, and organised lamp replacement.

J. S. S.

33. Planning a Street Lighting Installation.

A. J. Sweet. Am. Illum. Eng. Soc. Trans., pp. 1246-1285, 10, Dec., 1941.

A guide is given to the siting, choice of equipment and cabling in a street lighting installation. J. S. S.

34. Public Safety in Detroit as Affected by Street Lighting.

Anon. Am. Illum. Eng. Soc. Trans., pp. 1219-1246, 10, Dec., 1941.

The effect of improved street lighting on the number of fatalities in Detroit is analysed. A new type of reflector-refracter lantern is described. J. S. S.

35. Airport Lighting in the United States and Europe.

F. C. Breckonbridge. Am. Illum. Eng. Soc. Trans., pp. 1157-1183, 10, Dec., 1941.

Information obtained from a report in 1939 by the Civil Aeronautics Administration of America is used to compare airport lighting in Europe and the U.S.

J. S. S.

Examinations in Illuminating Engineering

The examinations in Illuminating Engineering instituted by the City and Guilds Institute in 1939 deserve to be more widely known—especially in view of their relation to Fellowship of the Illuminating Engineering Society. A very promising start was made in 1939, when the first examinations, in the "Intermediate" Grade, were held. On that occasion there were twenty-eight candidates, three-quarters of whom were successful. The outbreak of war has naturally interfered greatly with opportunities for young people to enter for the examination, and candidates in 1940 and 1941 have been few. In the circumstances the Institute deserves gratitude for persevering with the examination, and especially for introducing the Final Grade as well as the Intermediate in these two years.

It may be of interest to give some indication of the papers set in 1940 and 1941.

In the Intermediate Examination, lasting three hours, fifteen questions were set, of which only eight were to be attempted. Generally speaking, about a third of these dealt with the scientific background to illuminating engineering.

Each paper contained several questions asking for definitions and illustrations of familiar terms (e.g., "specular" and "diffused" reflection; "phosphorescence" and "fluorescence"; "polarised light"; and fundamental units.) About a third of the questions involved simple calculations or suggestions for planning, and the remaining third asked for information on gas or electric lamps or descriptions of photometric apparatus.

For the Final Examination two periods of three hours are allotted, corresponding to two papers (Section "A" and Section "B"). Each paper contains nine questions, only five to be attempted.

Section "A" dealt mainly with scientific aspects and photometry in general, whilst questions in Section "B" were of a more technical nature. The field is thus not widely different from that of the Intermediate examination, but the standard is more advanced. Amongst the more technical points touched upon may be mentioned the use of refractors and reflectors in lighting equipment, the effects of qualities of glass used for lamps and fittings, the optical system of a cinema lantern, applications of such terms as "co-efficients of utilisation," street lighting design, isolux diagrams, and technicalities of discharge lamps.

These examinations take place at the beginning of May in each year. We commend them to the notice of all members who desire to better their position in the lighting sphere. Full particulars are obtainable from the Superintendent, Department of Technology, City and Guilds of London Institute, 31, Brechinplace, London, S.W.7.

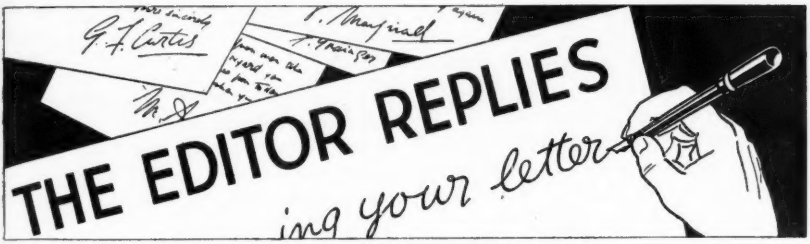
Office Lighting

A meeting of the Bath Group of the Illuminating Engineering Society was held on Wednesday, February 11, at the Bath Electricity showrooms, when Mr. J. B. Harris presented a paper entitled "The Light Conditioning of Office Buildings."

The author dealt generally with the artificial lighting of offices and stressed the importance of considering the subject from the welfare point of view, as is done in the case of industrial workers, and especially in relation to the preservation of eyesight. It was necessary to ensure that the lighting scheme installed provided adequate illumination on the working plane, and was also suitable as regards quality in that glare and shadows were minimised. Indirect lighting systems were advocated in view of the excellent light-diffusion resulting from their use. The use of cheap so-called "artificial daylight" fittings was deprecated. Some of these produced blue light only. For many purposes the desired effect could be obtained by using "fluorescent daylight lamps."

Various methods of treating board and conference rooms were outlined, and the maintenance of lighting schemes was also discussed. Mr. Harris concluded by expressing a hope that in any Government plans for improving the welfare of the nation due regard would be paid to the illumination of offices, "enabling all of us to live in the cheerful and healthy conditions which are our birthright."

An interesting discussion followed, in which Mrs. M. B. Probst, Councillor Barrett, and Messrs. Bowler, Tucker, Bennell, Coombes, Shepard, Allen, and West took part; Mr. Harris replying to the various questions raised. Votes of thanks to the author, Mr. Bowler (chairman), and the Bath Electricity Corporation were proposed by Mr. West, and the meeting terminated at 9.15 p.m.



Mr. Peirce's contribution to the recent I.E.S. "Problems" Meeting in London, and Mr. Waldram's comments on **shadows cast by fluorescent tubes**, have brought me some rather shocked inquiries from people who imagined that the "shadowless" quality of this light made it ideal for the lighting of drawing offices. That it is, in fact, useful in this way is proved by numerous installations—we illustrated one in our last number (p. 20)—but the discussion will at least have served a useful purpose if it indicates that a strictly "shadowless" lighting installation is yet to be found.

In fact we are dealing here with a somewhat specialised case of shadow produced from a straight edge illuminated by a line source parallel to it—a condition not difficult to alleviate or avoid. In practice the massing of tubes at very close intervals, the spreading of the line of light by reflectors or, still better, by reflection off white ceilings, aid in minimising these peculiar shadows. Nevertheless, I hold that for most purposes a symmetrical source, e.g., a tube in the form of a ring or spiral would be preferable. No doubt we shall get it in that halcyon period to come, when the war is over.

Mr. Sawyer's contribution at the same meeting, and Mr. Nisbet's recent remarks to the I.E.S. Scottish Centre, have been useful in emphasising the serious **loss of light in smoky or misty atmospheres.** But a secondary point—that the "lost" light does not simply vanish but is to a great extent scattered in the atmosphere, forming a species of **luminous mist**—is likewise important. Few people realise that the addition of light in this form may be quite as destructive to visibility as the loss in brightness through absorption. We have a familiar instance in the "fogging" of distant scenery. I am accustomed, in fine weather, to check my office clock by the distant view of Big Ben. In winter I can rarely do so—not so much because the light reflected from the clock face is lost on the way, but because the image is obliterated by the intervening luminous mist.

I have been asked to define what I mean in urging the need for **education** in connection with the **blackout.** In particular, attention has been drawn to the cautionary illustrated posters displayed by the Authorities and the Railways in this connection. Let praise be given where praise is due. There has been a great advance recently in this method of reaching the public. Many of these posters are both enterprising in design and excellent in intention, but, very naturally, they appeal in simple terms to the users of streets and railways, and emphasise only obvious points, easily grasped.

I suspect that the need for education extends also to those concerned in framing and applying legislative lighting restrictions, and that the facts set out in the I.E.S. Report on War Time Street Lighting and Aids to Movement are not

yet sufficiently known or understood. There are, however, certain modifications necessary in **the present lighting restrictions** before any substantial improvement in conditions can be expected, notably in regard to the fixing of definite numerical limits to brightness which can be measured, the insistence on the maintenance of desirable minima as well as maxima, and the sanction of a little more light as well as greater freedom in the application of it in certain situations out of doors.

I have heard complaints of the diamond-shaped **apertures** in the webbing attached to **railway coaches** on the Underground which, though larger than those previously allowed, still make it difficult to inspect the names of Tube stations. The difficulty is that the reflection of the interior of the coach is so much brighter than the exterior surfaces seen through the glass, especially when one attempts to look through the latter obliquely. In some cases the blueish lacquer on the glass dims transmitted light and possibly accentuates reflection at small angles, and it has been suggested that the white border is a drawback to visibility, as it makes any illuminated surfaces inspected through the glass appear darker by contrast. All this may be true, but the inconvenience can hardly be avoided—assuming that the use of the protective webbing is necessary and worth enduring in consideration of the part of the journey taking place in the open. It is certainly less than that experienced on surface railways, of which mention was made last month.

The period of daylight is now mercifully lengthening, and the inconvenience of the black-out is becoming correspondingly less. But it is represented to me by a reader that we are still suffering from another practice, which he terms **"the black-in."** What he says is, in effect, that in some buildings a hard and fast system of shuttering is adopted, coupled with complete extinction of artificial light after office hours, with the result that those who leave their work only a little after 6 p.m. find themselves groping in Stygian inner darkness, which is only relieved when they step out into the daylight out of doors! One can understand the routine closing of shutters before daylight has vanished, and the use of a permanent black-out on windows opening on staircases, etc., but in such cases some degree of artificial illumination, if only that from an occasional pilot light, ought to be available.

My attention has been drawn to a new feature in *Illuminating Engineering* (the journal of the Illuminating Engineering Society in the United States). Under the heading **"It seems to me,"** expressions of view are invited, and in the January issue a plea is put in for genuine and fervent discussion. Too many people devote too many words to congratulation of the author or to laments of their own ignorance, and there are also those who inhibit discussion by the opening, **"I don't want to start an argument . . ."** The function of a discussion is to discuss, and I, too, much prefer the "have at thee" attitude, once recommended by the Illuminating Engineering Society in Australia in this connection. One excuse for committee meetings, often prodigal of time in reaching decisions, is that they have a certain social and educational value—for the discussions to which they give rise are often of a much more spirited and pointed character than are met with at general meetings.